Institution: University of Kent

Unit of Assessment: 10: Mathematical Sciences

1. Unit context and structure, research and impact strategy

This submission comprises the research activities and achievements of Kent's School of Mathematics, Statistics and Actuarial Science (SMSAS), which forms part of the Division of Computing, Engineering and Mathematical Sciences (CEMS). The School's research is organised into three research groups: Mathematics; Statistics; and the Centre for Actuarial Science, Risk and Investment (CASRI), and includes the work of 33 Category A staff (32.7 FTE), of whom seven are early career researchers (ECRs). The research activities in our three research groups fall within several broad research themes, which provide a structure for our research seminars, reading groups, and staff mentoring. They stimulate collaboration, the sharing of expertise, and encourage cross-disciplinary research activities within the School and beyond. The themes are broad, and many staff are active in more than one theme.

Mathematics: Research in the Mathematics Group is centred around three themes: **Algebra, Geometry, and Topology (AGT)** (Bowman, Hone, Launois, Paget, Pech, Roitzheim, Shank, Sibilla, Topley, J. P. Wang, Woodcock); **Mathematical Analysis and Computational Mathematics (MACM)** (Clarkson, Deano, Iliopoulou, Hydon, Lemmens, Loureiro, Wood); and **Mathematical Physics and Nonlinear Systems (MPNS)** (Bearup, Clarkson, Deano, Dunning, Hone, Krusch, Loureiro, Pech, Topley, J. P. Wang, Wood). The team comprises five Professors, five Readers, six Senior Lecturers, and five Lecturers.

Statistics: Research in the Statistics Group falls within two themes: **Statistical Ecology (SE)** (Bearup, Cole, Matechou, McCrea); and **Statistical Methodology and Applications (SMA)** (Bentham, Kalli, Kume, Leisen, Liu, X. Wang, Zhang). The team comprises two Professors, one Reader, three Senior Lecturers, and four Lecturers (plus Bearup from the Mathematics group).

CASRI: Research in CASRI focuses on the theme: **Actuarial Risk Management (ARM)** (Alai, Tapadar), the team comprising one Senior Lecturer and one Lecturer.

A core aim of the School's mission is to deliver original and impactful research of the highest quality in Mathematics, Statistics, and Actuarial Science, and to foster interdisciplinary research. In this REF period, the School has significantly grown its external research funding: it was awarded over £3.5 million in grants since 2014. The School has also hosted several distinguished fellowships: Pearson was an EPSRC Early Career Fellow (2015-17). Hone is an EPSRC Established Career Fellow (2014-20). Topley was awarded a UKRI Future Leaders Fellowship in 2019.

SMSAS has a strong focus on the development of ECRs, and actively supports and promotes equality, diversity, inclusivity (EDI). The School was the first at the University of Kent to be awarded an Athena SWAN Silver Award (2018).

The success of SMSAS over the last decade is reflected in the University's strategic decision to invest £35 million in the new Sibson Building, which the School has shared with Kent Business School since 2017. This award-winning building is a major asset to the School.

Research strategy

The primary objectives of SMSAS's research strategy are to produce and disseminate high-quality innovative research at the forefront of our disciplines, to maximise the impact of all our research activities, to support and train researchers at all career stages, and to enhance the School's research reputation nationally and internationally. Below we provide details on the main actions taken in this REF period to realise these objectives. These actions follow on from our REF2014 submission and are:

1. Further enhance the high-level research activities in our established research themes.
2. Expand the research activities and build research capacity in the Mathematical Analysis and Computational Mathematics theme.
3. Grow the number of PhD students and enrich our vibrant research environment.
4. Introduce progressive EDI policies in the School to support staff to reach their full academic potential.

These actions have been the driving forces behind the successes that the School has enjoyed in this REF period, and the recognition it has received through various awards. In 2020, two of our statisticians received prestigious awards from the Royal Statistical Society (RSS). McCrea was awarded the Guy Medal in Bronze 'for her innovative and novel work in statistical ecology'. Emeritus Professor Morgan received the Barnett Award for 'ground-breaking work in statistical ecology'. Clarkson was awarded the distinguished 2020 Senior Anne Bennett Prize by the London Mathematical Society (LMS) in recognition of his influential work on promoting equality, diversity, and inclusivity practices in UK mathematics.

1. Enhancement of research activities in the established research themes

At the start of the REF period, research in the AGT theme was centred around Representation Theory, Invariant Theory, Algebraic Topology, and Quantum Groups. Through several strategic appointments, this theme has significantly widened its scope and strengthened its connections with research in the MPNS theme. It now includes research in Algebraic Geometry, Mirror Symmetry, Derived Geometry, and Algebraic Combinatorics. In 2015-16, two positions in Geometry and Topology were created as a result of the University's strategic investment initiatives. They were awarded to ECRs (Pech, Sibilla), whose expertise complements the research of Roitzheim and Launois in AGT, and Hone and J. P. Wang in MPNS. In 2017, Bowman was appointed to further strengthen our research in Representation Theory and Algebraic Combinatorics. In 2019, Topley, who at the time was research associate (RA) on Launois' EPSRC grant, was awarded a UKRI Future Leaders Fellowship to support his research at the interface between Geometry and Representation Theory. He was subsequently appointed as a Lecturer. Researchers in the AGT theme have made ground-breaking contributions in this REF period. Particular highlights include work by Bowman, who settled several longstanding problems and conjectures in Representation Theory, and works by Launois and Topley, who pioneered novel methods from Model Theory in the study of Poisson Algebras.

The MPNS theme focuses on Classical and Quantum Integrable Systems, Topological Solitons, Symmetries and Conservation Laws, Random Matrix Theory, and Mathematical Biology. Our research in Integrable Systems has been recognised for many years to be among the strongest in the UK. Hone was awarded an EPSRC Established Career Fellow in 2014 to work on a cross-disciplinary project concerning interactions between Integrable Systems, Algebra, and Number Theory. Work by J. P. Wang and Tian on the classification of super-symmetric evolutionary equations was included in the 'Highlights from 2017' issues of *Studies in Applied Mathematics*. In this REF period, external funding has supported one fixed-term lectureship (Xenitidis, 2015-18), and three RAs (Kouloukas, 2016-20; Lampe, 2018-20; and Casati, 2018-20). The theme has hosted four long-term visitors who spent their Fellowships or study leaves with us (see below), and several world-leading researchers in the field visited the School for short periods of time, including Van Assche (Leuven), Kodama (Ohio), and Sokolov (Landau Institute for Theoretical Physics).

The SE theme in the Statistics Group has a longstanding reputation for research excellence, and has enjoyed numerous successes in this REF period. To sustain its vitality, an early career statistical ecologist (Matechou) was appointed in 2014. The appointment of a mathematical biologist (Bearup) in 2017 provides a new bridge between the MPNS theme and the SE theme. The School's support for ECRs has been instrumental for Matechou and McCrea to grow into its future leaders. McCrea, who is the winner of the Guy Medal in Bronze, was promoted from Senior Lecturer to Professor in 2020. The theme has been successful in securing research funding, which

has supported two RAs (Diana and Rodriguez de Rivera Ortega). There is a considerable drive for impactful interdisciplinary research within this theme. It has strong collaborative links with numerous wildlife and conservation organisations, which are often formal project partners on active grants and facilitate CASE PhD studentships. Researchers in the SE theme have developed important new stochastic models to make better use of all information contained in complex datasets in ecology. One of the research highlights includes the development of a new model for environmental DNA data, which, for the first time, accounts for both false positive and false negative errors.

The SMA theme has key research strengths in Bayesian Nonparametric Models, Statistical Shape Analysis, Data Science, and Machine Learning. It has strong links with industry and external organisations. Research in this theme underpins two of our impact case studies. In this REF period, we appointed Villa (2014, ECR) and Kalli (2017) to enhance research in Bayesian Nonparametric Models. The theme was further strengthened by the appointment of two other ECRs: Bentham (2017) and Liu (2019). Their research expertise in Data Science and Machine Learning complements the research of Zhang and X. Wang. Research in this theme is truly interdisciplinary, with members publishing in top conference proceedings in data mining and in prestigious medical journals such as the *Lancet* and *Nature*, as well as in leading statistics journals. Research by Bentham and collaborators on obesity and diabetes is used in the WHO Global Report on Diabetes 2016 and as official UNICEF statistics. The theme has also been awarded a KTP to support an industrial collaboration with KROHNE Ltd, and participated in another KTP project with Zero Trace Procurement Limited. Members of this theme have undertaken ground-breaking work in Statistical Methodology. Particular highlights include work by Leisen (joint with Griffin), who pioneered a unified framework for dependent random measures called compound random measures for Bayesian nonparametric mixture models, and fundamental work by Zhang, who developed a new methodology for beamforming, which is an important statistical tool used in software for brain imaging analysis.

2. *Intensify research and build capacity in the MACM theme*

At the start of the REF period, the School set out to expand its research activities in Numerical Analysis. In 2015, SMSAS appointed Pearson, who secured an EPSRC Early Career Fellowship soon thereafter. In the same year, the School appointed early career numerical analysts Xu and Deano. The latter's research provides a bridge to the MPNS theme. The appointment of Hydon as Head of the School in 2015 further strengthened our research in Numerical Analysis.

Research in Numerical Analysis complements existing research expertise in Mathematical Analysis, which is wide-ranging. It includes: Geometric and Nonlinear Functional Analysis; Spectral and Operator Theory; Special Functions and Orthogonal Polynomials; Harmonic Analysis; Approximation Theory; and Geometric Integration. The theme has seen rapid developments in this REF period, and has provided an excellent environment for the ECRs to flourish. Some have taken up prestigious positions in the UK or abroad: Pearson moved to Edinburgh in 2017; Waterstraat took up a professorship in Halle (Germany) in 2018; and Xu became a research professor at the University of Science and Technology of China in 2018. To ensure the sustainability of the theme, Iliopoulou was appointed in 2019. The theme has supported three RAs, two funded by EPSRC grants and one internally funded to support Hydon. The theme has hosted the 14th International Symposium on Orthogonal Polynomials, Special Functions and Applications (2017), one of the flagship events in the field. A particularly noteworthy research highlight is the ground-breaking work by Iliopoulou and co-researchers, who settled an open problem by Hörmander on oscillatory integral operators, standing since 1973, and derived the best-known bounds for the famous Bochner-Riesz conjecture in Fourier multiplier theory.

3. *Grow our PGR student numbers and enhance our vibrant research environment*

During this REF period, an average of 8.6 students have been awarded a PhD each year (2014: 5; 2015: 7; 2016: 6.5; 2017: 8; 2018: 14.5; 2019: 8.5; 2020: 11), up from 6.5 in the previous REF period. The School was able to grow the number of PhD students by match-funding scholarships,

securing additional University-funded scholarships, and attracting support from industrial partners and external organisations. Two studentships were partially funded by the Radfall Charitable Trust, and a third was funded by the Institute and Faculty of Actuaries. We also have three CASE PhD studentships in Statistical Ecology, two of which are funded through the NERC Advanced Research and Innovation in the Environmental Sciences (ARIES) Doctoral Training Partnership (DTP), and a third is in partnership with the Centre for Ecology and Hydrology. We recruit high-quality PhD students from the UK and abroad, and have a diverse PGR student population, with students from the UK, France, Germany, Greece, Italy, the Netherlands, Spain, China, India, Mauritius, Guyana, and South Africa.

Over this REF period, the School has supported nine RAs through externally funded projects. In 2019, there were seven EPSRC-funded postdoctoral RAs. The School has also internally funded one RA to work with Hydon.

The School's research environment was further enriched by the appointment of 11 ECRs on fixed-term Education & Research (E&R) contracts in this REF period. These positions came with a significantly reduced teaching load to give the ECRs the opportunity to gain teaching experience and to further strengthen their research profile.

In this REF period, the School has hosted two Marie Curie fellows (Casteels and Naboko) and numerous international visitors, including several longer-term (more than six months) international visitors: Rossini (Italy, 2015-16), D. Jiang and J. Li (China, 2015-16), K. Tian (China, 2016), Pereira (Brazil, 2016-17), Gómez-Ullate (Spain, 2017), C. Yang (China, 2018-19), Cesar de Souza (Brazil, 2018-19), and X. Duan and C. Li (China, 2019-20). The long-term visit of Jordaan (South Africa) to Kent to work with Clarkson, as part of her Royal Society Newton Advanced Fellowship, was postponed due to Covid-19. This growing international dimension has greatly enriched our research environment.

The School has a vibrant research community. It runs five regular seminar series and a Postgraduate Seminar Series. It is also involved in organising several virtual seminar series: the RepNet Virtual Seminar (Bowman); Virtual Integrable Systems Seminars (Clarkson); and Virtual Harmonic Analysis Seminars (Iliopoulou). The new state-of-the-art Sibson Building has enabled us to host numerous research events. On average, five externally supported workshops have been held in the School each year. These include a number of high-profile research events: Total Positivity: A Bridge between Representation Theory and Physics (2016); the 14th International Symposium on Orthogonal Polynomials, Special Functions and Applications (2017); Young Researchers in Mathematics (2017); National Centre for Statistical Ecology meeting (2017); Actuarial Teachers' and Researchers' Conference (2017); EPSRC Inverse Problems Network (2019); LMS Women in Mathematics Day (2019); and Interactions between Representation Theory and Model Theory (2019).

   4. *Introduce progressive EDI policies in the School to support staff reach their full academic potential*

In the course of the REF2021 period, the School has introduced a number of progressive EDI policies. It allocates a generous amount of research time to staff returning from maternity (or shared parental) leave, and from extensive periods of sick leave, to provide staff with the time to pick up their research activities. This policy has been very successful, with two members of staff securing substantial grants shortly after returning from maternity leave ▮▮▮▮▮▮▮▮▮▮ ▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮. Further details on our EDI actions that have resulted in our Athena SWAN Silver Award are supplied in Section 2 below.

Research Strategy 2021 onwards

In line with the University's Research & Innovation Strategy 2025, our future research strategy aims to further enhance the national and international research and innovation profile of the School, maintain the vitality and sustainability of our research environment, and further embed

progressive EDI policies to help our staff and our postgraduate researchers realise their full potential. In particular, we aim to:

1. *Strengthen our interdisciplinary research and increase our external research and enterprise income*

We will further extend our research collaborations through the Eastern ARC, a research consortium between the universities of East Anglia, Essex, and Kent. In particular, we will intensify our involvement in the ARIES DTP, in which members of the Eastern ARC are collaborating. We will also actively participate in the University's new Signature Research Themes (SRT) to foster interdisciplinary collaborations and develop new networks within the University. McCrea is the sciences Theme Lead for the Migration and Movement SRT. Building on existing expertise in Statistical Data Science, Machine Learning, and Biomedical Statistics (Bentham, Liu, Zhang), we intend to develop strong research links with the new Kent and Medway Medical School (KMMS), which opened on our Canterbury campus in 2020. We will also take advantage of the newly created academic Divisions in the recent University restructure, and intensify collaborations with the two other schools in our Division: Computing; Engineering and Digital Arts.

The School Director of Innovation and Enterprise (X. Wang) organised a number of meetings with potential collaborators from industry and academia in this REF period, including the 2019 workshop 'Mapping Out the Impact of Machine Learning', which was attended by representatives from more than 40 UK and international companies from a range of sectors. We intend to grow the number of this type of event and expand our involvement in interdisciplinary research projects and enterprise activities. This will help us diversify and grow our research income.

2. *Continue to support staff to deliver impactful high-quality research*

We will continue to support and enhance our existing research themes. In recent years, a number of our statisticians left: Kong took up a professorship at the University of Electronic Science and Technology of China; Griffin took up a professorship at UCL; and Villa moved to Newcastle University. In 2021, we will appoint two lecturers in Statistics. Over the course of the next REF period, we intend to make further investments in the Statistics Group through the recruitment of promising ECRs, and continue to support current members of the group to grow and develop into its future leaders. The new Division has a strong drive to grow its research activities and provides a supportive infrastructure for staff to do their research. Further details on the infrastructure are given in Section 3 below.

3. *Sustain our number of Research Associates and PhD students*

The School has a strong desire to participate in a Centre for Doctoral Training in the area of Algebra, Geometry, and Mathematical Physics. Activities to support an application for such a centre have already begun, and will be extended in the next REF period. We will continue to give our PhD students high-quality supervision and opportunities to attend conferences to present their work and to network. We will enhance our career events for PhD students and expand our training opportunities for our PGRs to develop their employability skills. The School has a strong track record of supporting ECRs to apply for fellowships to work in our School; for example, Topley's UKRI Future Leaders Fellowship. We will continue to provide support for such fellowship applications and attract high-quality ECRs through our existing research networks.

4. *Implement the Athena SWAN Silver Award action plan*

Throughout the next REF period, we will continue to implement our Athena SWAN Silver Award initiatives, which include actions to ensure that our research environment is inclusive and diverse, and that researchers at all levels in the School receive the support they need to realise their full research potential. We will maintain our strong support for ECRs and mid-career academics, and further develop our successful family-friendly policies, so that academics can have a fulfilling work/life balance. We have fully implemented the University's new Academic Career Map, which

sets out performance standards and promotion criteria at different levels, with transparency, and we will support and guide all our staff towards their career progression.

Enabling the realisation of impact

In this REF period, both the School and the University have made strategic investments to support the generation of impact. To support our impact activities in statistical ecology, SMSAS financially supported a two-year RA in 2015 (Dennis), to work on a project that was partly funded by Butterfly Conservation (£50k). The School has also successfully used University funding to organise outreach and training events to develop its impact case studies. In addition, we have prioritised PhD studentships that are associated to research projects underpinning impact work. Further support for the generation of impact was provided by the School's Strategic Research Fund. To further drive our innovation and enterprise strategy, the School created a Director of Innovation and Enterprise role in 2017, the post-holder being a member of the School's Research Committee.

In this REF period, impact was achieved via three routes:

   1. Influencing society to benefit the environment

The School has a strong track record of generating impact from its research in statistical ecology and wildlife conservation. Researchers in the Statistical Ecology theme have long-term collaborations with the Durrell Institute of Conservation and Ecology (DICE), the National Centre for Statistical Ecology, and UK and international charities including Butterfly Conservation, Mauritian Wildlife Foundation, and the Bumblebee Conservation Trust. They have developed novel statistical methods in ecology and conservation, which have led to new insights into biodiversity. Their research has influenced policy-makers and changed practices of ecological data collection through a variety of outreach and training events. The importance of this research was recognised by the Royal Statistical Society through distinguished awards to McCrea and Morgan, and also by the NERC grant award to Matechou, as part of its Strategic Priorities Fund.

   2. Industrial collaborations

Throughout this REF period, the School has collaborated successfully with companies and external organisations. It made substantial contributions to a joint project with KROHNE Ltd to develop new instruments to measure the flow rate of gas-liquid two-phase flows in industrial processes. The incorporation of advanced statistical and computational techniques, which had not been done before, has led to simplification of the instrument's design and enhanced its performance. This collaboration was supported by two KTP projects (KTP008285, 2011-13; KTP010905, 2018-20) led by X. Wang, both of which received grades of 'Outstanding' and certificates of excellence from the Technology Strategy Board (Innovate UK).

Research by Kalli (joint with Griffin) on Bayesian nonparametric methods was picked up by the Berliner Wasserbetriebe (BWB) at a conference in 2017, where Kalli was presenting. The BWB is the largest municipal water supply and sanitation company in Germany, servicing Berlin and surrounding areas. In a collaborative project, Kalli's research has been used to develop more accurate forecasting models to predict maintenance costs for BWB's sewage and water infrastructure. These more accurate predictions will impact positively on the water bills of millions of BWB's customers. Kalli's knowledge transfer project will thus have significant economic impact.

   3. Public engagement

The School has been involved with research-based public engagement for a long time. In 2015, the Mathematics Group was selected to participate in the LMS's 150th Anniversary Mathematics Festival at the London Science Museum. With a 2.5m wave tank and a vortex gun, members of the Mathematics Group created fluorescent green tsunamis and large smoke rings to engage the general public with our research on Integrable Systems and Solitons. The School also runs many outreach activities with secondary schools to engage students with its research. Activities include:

- A research project involving the crowdsourcing of pseudorandom dynamics developed by Hone in collaboration with the Institute for Research in Schools.
- Research opportunities for Year 12 and 13 students through the Nuffield Foundation summer research projects.
- Members of the Statistical Ecology theme ran two large outreach events: 'Statistics Gone Wild', for more than 200 Year 8 and 9 students. In these events, students were exposed to current ecological research from the Statistical Ecology theme.
- Annual Royal Institution Masterclasses for Year 6, 9, and 12 students.
- In 2017, we organised an LMS Girls in Maths event at Kent.

Future impact strategy and plans

Building on the experience in this REF period, we will intensify and expand the impact of our research by strengthening the contact with stakeholders beyond academia through hosting regular sandpit meetings and by providing networking and training events. We will actively seek new industrial partnerships by encouraging cross-disciplinary collaborations and consultancy. The School will also seek opportunities through its involvement in the University's Signature Research Themes to find pathways for impact. We will work with the University's Knowledge Exchange and Innovation (KEI) team to develop new links with the insurance industry and finance and risk consultancy firms through CASRI. We will continue to communicate our research to a wider audience via public lectures, including the University's 'Think Kent' lecture series, and expand outreach activities such as the Royal Institution masterclasses. Staff will also be encouraged to engage with the University's Corporate Communications team and the Office of Scholarly Communication to identify opportunities for wider dissemination of our research. The School will continue to support staff engaged with impact activities through its work allocation model and will provide support and training for staff developing impact cases.

Open Access

The School fully embraces the Open Access agenda. Through the University's Research and Innovation Services team and the Office for Scholarly Communication, all members of staff have access to training opportunities on Open Access, copyright, research metrics, and dissemination planning. The University's Templeman Library manages the Kent Academic Repository (KAR) database, which is an outward-facing research repository showcasing research publications of Kent researchers. Staff are required to deposit their publications on KAR, where they are monitored for Open Access requirements. Staff are also encouraged to put their work on arXiv. The University has contracts with Springer and Wiley that allow our researchers to publish Open Access without paying APC's. Close to 50% of our REF2021 outputs have been published Gold Open Access.

Research integrity

Throughout the REF period, the School had a representative on the Faculty's Research Ethics Advisory Group (REAG), which provides external ethics reviews for large grant applications. The School only had to seek advice for a couple of grant applications in this REF period. In the new Divisional structure, the School will have a representative on the new Divisional REAG.

2. People

A key part of the School's staffing strategy is to support staff to reach their full academic potential and to create a vibrant and sustainable research community that values equality, diversity, and inclusivity. There is a strong focus on the development of ECRs in the School, which is directly linked to our recruitment strategy. The only senior-level appointment that we made in the REF2021 period was Hydon as Head of School. Our research reputation and research environment attract excellent applicants for all new and replacement posts, and have enabled us to appoint staff of the highest calibre from the UK and abroad. Staff appointed since 2014 are originally from Canada, China, France, Germany, Greece, Italy, Spain, and the UK.

Staffing strategy and staff development

Our recruitment strategy focuses on appointing promising ECRs to strengthen or expand existing research themes in the School. In this REF period, the School has made significant staffing investments by appointing 18 permanent Category A staff: 17 staff at Lecturer level and one Head of School at Professorial level. In the same period, there were three retirements and 11 Category A staff left the School for positions elsewhere. Among those, seven returned to their home country to continue their academic career, one went into industry, and three took up positions at other universities in the UK. Over the REF2021 period, there has been a net gain of four Category A staff, which has both strengthened and diversified our research activities.

In this REF period, we also employed 11 ECRs on fixed-term E&R contracts to cover long-term fellowships, maternity (or shared parental) leaves, and study leaves. These ECRs have further enriched our research environment. The fixed-term positions came with a 50% teaching reduction to enable the ECRs to further develop their research profile, while gaining teaching experience. Eight of them found permanent positions in academia: Adamopoulou at Heriot-Watt; Argiento at Università Cattolica del Sacro Cuore of Milano; Besbeas at Athens University of Economics and Business; Hadjiantoni at the University of Essex; Lecoutre at Université Clermont Auvergne; Towers at UCL; Xentidis at Liverpool Hope University; and Zhu at City University of London.

1. *Staff development*

Beyond the University's infrastructure for staff development and career progression (see the institutional-level environment statement), the School has continued to implement the UK Concordat to Support the Career Development of Researchers, through recruitment and appraisal procedures, commitment to EDI, and encouraging the uptake of training and development opportunities. All staff members benefit from an annual appraisal (under the University's 'Reflect, Plan, Develop' framework) with the Head of School or Head of Group. In addition, all E&R staff annually discuss their Individual Research Plans with the School Director of Research in an informal meeting, which provides an opportunity for staff to reflect on personal achievements, to discuss future research, grant applications, potential EDI-related barriers, and the support required for their research.

In this REF period, a number of our staff have also participated in national leadership training schemes such as Advance HE's AURORA (three staff members), in the University's Leadership for Areas of Significant Responsibility (LASR) programme (five staff members), and in Kent's Insights programme, which is Kent's Women's Senior Leadership Programme (one staff member).

The School holds annual staff Away Days, where half of the time is devoted to research matters, reflecting our dual-intensity approach. Research-active staff are encouraged to apply for study leave in accordance with the University's study leave regulations. In the last four years, more than one-third of our staff have taken leave for either 12 or 30 weeks to concentrate on their research, this having a positive impact on grant applications and research outputs.

2. *ECR support and probation*

Probationary staff are required to complete the University's Postgraduate Certificate in Higher Education (PGCHE), and are assigned a mentor to help them settle into the School. They are also required to write a probation plan, against which progress is assessed on an annual basis. To write the probation plan, they receive support from their probation supervisor (a senior member of staff), who provides advice and comments on the progress made. All probationary staff have significantly reduced teaching load (50%-75% of a normal load) and minimal administrative tasks. They are invited to join a PhD supervisory team, and are prioritised in PhD studentship allocations after their probation is completed. They also receive an additional £1,000 funding to support their research activities. During their probation period, they are expected to apply for a significant grant such as an EPSRC New Investigator Award.

3. Development of Research Associates

All our RAs are fully integrated into the School, and a range of opportunities are provided to help them develop their career. They take part in our research seminars and are often involved in their organisation. They also have access to staff development courses and are given opportunities to engage with all aspects of academic life in the School: lecturing, supervising MSc projects, and running undergraduate summer research projects and outreach activities. RAs are invited to participate in the termly meeting of the School Board and the School's Away Days. They are appraised annually by the School Director of Research, and receive additional career support such as feedback on CVs, job applications, fellowship proposals, presentations, and mock interviews. Our approach has been successful, with many RAs finding academic positions: Casteels: Lectureship at the University of California at Santa Barbara, USA; Lampe: Lectureship at Europa-Universität Flensburg, Germany; Fasondini: postdoctoral position at Imperial College, London; Casati: Associate Professorship at Ningbo University, China; and Roelands: Lectureship at Leiden University, Netherlands. Topley was awarded a UKRI Future Leaders Fellowship.

4. Promotion

The University has a promotion process that recognises and rewards all aspects of academic excellence. This process, with the timetable and links to HR documentation, and the role of the School Promotion Panel (SPP), along with mentoring information, is communicated by the Head of School to all staff each year. The SPP was introduced in 2013 to advise and support academic staff on applying for promotion and career development. It actively considers EDI issues and potential barriers. All non-professorial staff are invited annually to submit their CV to the SPP, together with a draft application form in cases where they wish to make a promotion application. The SPP discusses the merits and strengths of all CVs and draft applications at an annual meeting, and encourages submission of CVs from some who do not self-nominate. Feedback is provided to each applicant in an informal one-to-one meeting. Those who decide to make a promotion application are given advice on preparing their case for promotion by an experienced member of the SPP. In addition, the School offers informal mentoring on career development that is available at any time during the year. It regularly holds Athena SWAN events aimed at demystifying the promotion process. The University also holds annual workshops for individuals who are preparing their cases for promotion.

The extensive support for career development offered by the School and the University has contributed to the successful career advancement of a number of our staff in this REF period: three to Professor (Launois, McCrea, J. P. Wang); five to Reader (Bowman, Deano, Dunning, Leisen, Lemmens), and six to Senior Lecturer (Krusch, Loureiro, Paget, Roitzheim, Wood, X. Wang). Among those staff, one was promoted to Professor from Senior Lecturer, and two were promoted to Reader from Lecturer. In the 2020 promotion round, Kalli, Matechou, and Pech were all promoted to Senior Lecturer (announced in May 2020 and effective from October 2020).

Research students

Since 2014, the School has benefited from an average of 35 PhD students funded through studentships from the University, the School, and EPSRC. All studentships are offered for 3.5 years. Robust recruitment and selection procedures ensure that the School only recruits the best-qualified candidates and does so transparently and equitably. PhD studentships are advertised nationally and internationally, and shortlisted applicants are interviewed by a diverse selection panel. The panel for the Periodic Programme Review (March 2017) commended the School for the quality of the research student and supervisor relationship. Feedback from the annual PRES has been outstanding, with an average overall satisfaction of 92%, and 94% average satisfaction with supervision in the last four years. Since 2014, 61 students successfully completed their PhD degree (two withdrew). Our extensive training and support mechanisms have ensured that all PhD submissions have been within four years. More than half of our PhD students secured a position in academia or a research position in industry.

1. Training and support mechanisms

Our postgraduate researchers have a supervisory team with a lead academic supervisor and a second supervisor who often has a more pastoral role. As well as regular supervisions, there are scheduled formal review meetings where research progress, skills training, and publishing opportunities are discussed. At institutional level, the Graduate and Researcher College (formerly the Graduate School) is responsible for shaping the strategic development of postgraduate research in the University. The College plays a key role in developing and supporting the research environment for our PGRs. It offers training courses for PGRs as well as for PGR supervisors. In addition to structured supervision by their supervisory team, all our PGRs receive formal research training and career development training. They attend at least 100 hours of assessed taught courses to broaden their subject knowledge. Options are chosen from courses provided through two taught course centres: the Academy for PhD Training in Statistics and the London Taught Course Centre (LTCC). In addition, our PGRs can take advanced courses from our MMath and MSc programmes. During this REF period, staff have delivered eight LTCC basic and advanced courses. Our PGRs also complete the University's Researcher Development Assessment and reflect annually on their skills and training needs.

In the School, PGR career events are organised regularly. Workshops include: CV skills for academic and professional jobs; workshops on varied career opportunities; and presentations on academic career paths. Supervisors support their PGRs by helping them prepare academic job applications and practise presentations and interviews. Our PGRs are encouraged and financially supported to attend national and international conferences. They attend on average at least two international conferences during their period of study. The School also runs a Postgraduate Seminar series, which gives our PGRs additional opportunities to present their work and to practise their communication skills. Our PGRs gain teaching experience through teaching on UG modules and marking; for this, they are given appropriate training, and their teaching is observed by members of staff, with informal feedback sessions thereafter.

2. Achievements

Our PGR students regularly attend national and international conferences, and are also involved in the organisation of national events. In 2017, our PGRs organised the Young Researchers in Mathematics conference at Kent. Many of our PhD students obtain travel awards from conference committees or funding bodies, and have also won prizes. For example, Jiménez-Muñoz won the Silver Award for Mathematical Sciences at the STEM for Britain event at the House of Commons in 2019. Research students who graduated during this REF period have (co-)authored over 70 peer-reviewed publications. Many of them have received prestigious prizes and scholarships after graduation. Lecoutre (2015) secured a 150th Anniversary Postdoctoral Mobility Grant from the LMS. Nolan (2017) won the 2016 Cecil King Travel Scholarship from the LMS. Papamikos (2016) secured a Richard Rado postdoctoral fellowship at the University of Reading. Fischbacher (2017) secured a postdoctoral position at the University of California at Irvine. Ishak (2019) was appointed to a postdoctoral fellowship at Vanderbilt University, Nashville. Jeyam (2017) secured a postdoctoral position at the University of Edinburgh. Jiménez-Muñoz (2019) was appointed to a postdoctoral position at the German Centre for Integrative Biodiversity Research. Diana (2020) secured a postdoctoral position at the University of Kent. Lima (2020) won an LMS Early Career Fellowship. Pallister (2020) won a JSPS fellowship.

Equality, diversity, and inclusivity

SMSAS is fully committed to promoting EDI to ensure that all our staff have the opportunity to make contributions to our research activities and to succeed in their research ambitions. In this REF period, the School was awarded an Athena SWAN Bronze Award in 2014, the first School in the University to receive an Athena SWAN Award. This was followed by an Athena SWAN Silver Award in 2018, one of only nine mathematics departments in the UK at the time to hold a Silver Award. These awards recognise the School's commitment to supporting gender equality within higher education and research, and showcased the wide range of positive actions we have taken to achieve this.

The School's EDI Committee holds five scheduled meetings annually. Its role is to analyse the effects of School and University policies on EDI, to work to improve policies and build consensus to implement new initiatives, and to embed awareness of EDI issues throughout the School. It organises training events such as the half-day in-person unconscious bias training for all staff, and holds information sessions (often tied to termly Athena SWAN lunches). Information and issues are fed into the EDI Committee through our organisational structure. The Chair of the EDI Committee is a member of the School's Management Committee and also sits on the School Promotions Panel. EDI is a standing item for all committees, group meetings, and boards of study, with discussion points and updates referred to these meetings from the EDI Committee. The EDI Committee also holds termly Athena SWAN themed lunches, focusing on relevant issues such as staff with caring responsibilities, the promotion process, and unconscious bias. The Committee designs regular staff surveys to capture diversity better, and to identify areas in need of further improvement. All staff in the School have undertaken Kent's internal EDI training and all staff on appointment panels and the REF Working Group have received additional Unconscious Bias Awareness training.

The School has been signed up to the LMS Good Practice Scheme since 2012. Clarkson was the Chair of the LMS Good Practice Scheme steering committee (2013-18) and is a member of the Equality Challenge Unit's Athena SWAN working group. He received the Senior Anne Bennett Prize awarded by the LMS in 2020, 'in recognition of his tireless work to support gender equality in UK mathematics, and particularly for his leadership in developing good practice among departments of mathematical sciences', as the prize's citation read. Our EDI initiatives have greatly benefited from his leadership.

For this submission, our Category A staff consists of 12 women (two Professors, one Reader, five Senior Lecturers, and four Lecturers) and 21 men (five Professors, five Readers, five Senior Lecturers, and six Lecturers). The proportion of female Professors has increased to 29% compared to 11% in REF2014. Three out of nine members of the School's Management Committee are female. Five female members of the School have participated in internal and external leadership training programmes: Dunning, Loureiro (Aurora), Paget (Insights), and Dunning, Laurence, J. P. Wang (LASR). Of the 14 staff members who were promoted during the REF2021 period, seven are female, including one to Professor from Senior Lecturer.

School meetings and seminar series are held within core hours to maximise the opportunity of attendance, especially for staff with caring responsibilities. Within the REF period, the percentage of external female speakers invited by the School has improved from 16% in 2013-14 to 32% in 2016-17 (data from our Athena SWAN Silver application). The University has a number of Family-Friendly Practices to make working for staff with, or starting, a family as easy as possible. The School follows all these policies to create a flexible working environment. SMSAS put in place comprehensive maternity/adoption leave policies that go above and beyond the University's policies in 2014, and these have been adopted by several other Schools across the University. We believe maternity leave can be a critical time in a researcher's career, and resources must be devoted to help maintain a vibrant research programme. Any staff member returning from an extensive period of leave, such as maternity or shared parental leave, receives a significantly reduced teaching load for a period of 12 months after returning and a reduced administrative load. In addition, they receive an extra £1,000 to help them renew their research activities. Staff going on extensive leave have discussions before leaving about their planned teaching allocation for their return, and Keeping in Touch days are used to support staff members on leave to stay connected with research and the School. In the current REF period, six Category A staff have taken maternity leave and have benefited from the School's policies. The return rate is 100%, and all of them remained fully research active after returning. Two of them secured significant grants shortly after returning from leave.

The School has implemented an evidence-based and transparent REF process, following the University's Code of Practice. The School REF Working Group consists of six members of staff (two female), with representatives from each research theme. All Category A staff have had the opportunity to discuss their output selection and comment on a draft of the Environment Statement

in face-to-face meetings with members of the REF Working Group. For the output selection, the Working Group relied on internal and external reviews of outputs, as well as ranking by the author. It has also sought to balance the outputs of the different research themes to give a fair reflection of the research activities in the School.

3. Income, infrastructure and facilities

Income

Since 2014, the School has been awarded research grants worth over £3.5 million from a variety of funding bodies. This is a significant increase in comparison with the £2.2 million in the previous REF period. Funding has included: EPSRC: £2.38 million from eight awards (one Established Career Fellowship, one Early Career Fellowship, one Network award, one First Grant, one New Investigators Award, and three Standard Grants); UKRI: £647k from one award (Future Leader Fellowship); NERC: £340k from two awards; European Union: £82k from one award; Institute and Faculty of Actuaries: £98k from one award; and KTPs: £83k from one award. Numerous small grants have also been obtained from the Royal Society, Leverhulme Trust, London Mathematical Society, and Institute of Physics.

Staff on E&R contracts are expected to apply for grants regularly. Members of the School are supported in the development and submission of grant applications by the University's Research and Innovation Services team and also by the School's Research and Innovation Committee. Research and Innovation Services (working with the Graduate and Researcher College) provides training opportunities, grant development workshops, advice on costings, and arranges internal competitions, mock interviews, and reviews. At School level, staff benefit from advice from experienced colleagues who have served on recent EPSRC/UKRI panels (Clarkson, Dunning, Hone, Launois, McCrea, Roitzheim). All grants over £60k are reviewed within the School. Staff are incentivised to submit high-quality grant applications, and receive a supplement to their annual travel allowance for a near-miss large grant application. The Research and Innovation Committee oversees the School's research strategy and coordinates the support for grant writing. It holds a £10k strategic development fund to support staff in the development of their research and innovation activities. In this REF period, the School has supplemented several fellowships and grants by extending the length of the RA position associated to the project.

All staff are given a fixed allocation of research time in their work allocation. Additional time is reserved for the development of research grant proposals, as well as PhD and RA supervision. Staff on grants receive additional research time in their work allocation. Within the School, staff have an annual travel budget and are encouraged to accept invitations to organise and participate in long-term research programmes, provided there is sufficient capacity to cover their teaching.

The School promotes a culture of engagement with the wider world and supports staff to find pathways for the knowledge generated by their research to benefit and influence society, culture, our environment, and the economy. Staff who are extensively involved with impact activities receive credit for it in our work allocation model. The Director of Innovation and Enterprise works closely with the University's KEI team to foster industrial contacts, and organises meetings with potential industrial partners. For most of our industrial collaborations, KEI provides assistance with the management, contracts, and development. It played a key role in the development of the KTP project with KROHNE Ltd.

Through CASRI, we foster strong links with financial organisations and insurance companies. For instance, Alai and Tapadar were involved with two consultancy projects at Aviva Central Services Ltd in 2015 and 2016. Through our research in Statistics, we maintain links with a variety of organisations and charities, which have led to consultancy projects and PhD studentships. In addition to external sources, the School has taken advantage of the University's internal funding schemes. All our impact case studies have benefited at various stages from the University's Research and Impact Support Funds. The School also generates income through the Stats Desk, which is an on-campus service funded by the University to assist academic colleagues and research students on statistical matters.

Infrastructure and facilities

The University recognises the strengths of SMSAS. In 2017, the School was re-housed in the new Sibson Building, funded by a £35 million University investment, which won the Royal Institute of British Architects Regional and National Award. The building, which we share with Kent Business School, not only provides modern staff offices, and spaces for collaborative discussions, but also contains three state-of-the-art lecture theatres, seminar spaces, dedicated rooms for our postgraduate students, and offices for RAs, research visitors, and emeriti. All academic staff have their own office, and RAs and PhD students share offices.

It is School policy to refresh desktop computers every three years and to provide licences for relevant computing software. The School also maintains a computer cluster of three servers for researchers to store and process research data and to perform high-performance computations, and has a dedicated IT Support Officer. The School also benefits from a Research Support Officer, who assists with the organisation of scientific events in the School and supports the Director of Research.

The University's Templeman Library provides online subscription to AMS reviews and to the majority of journals relevant to our research. In this REF period, the Library has significantly grown its access to e-book collections in mathematics and statistics. The Library also manages the KAR database, which collects research publications of University of Kent researchers.

4. Collaboration and contribution to the research base, economy and society

Research collaborations

All our staff have active research collaborations and regularly host visitors, make research visits, and collaborate on joint research projects. Approximately one-third of submitted outputs are with international co-authors. The School has hosted over 30 short-term research visitors and 10 long-term visitors (six months or more) in this REF period. Several of our grants involve national and international partners. Two EPSRC standard grants are held jointly with other UK institutions: University of Leeds and Queen Mary University of London. The co-investigators on Matechou's NERC research grant are from the University of East Anglia, Lancaster University, Durrell Institute of Conservation and Ecology at Kent, and University College London.

Staff are also working collaboratively on projects funded in other countries. Hone was a Partner Investigator for an Australian Research Council Discovery Grant (2014-16) with investigators from the University of New South Wales and La Trobe University. He was also the international partner on a SPIRIT project (2013-17) with a team from the Norwegian University of Science and Technology and the University of Bergen funded by the Research Council of Norway. Since 2015, Tapadar has led the pension modelling team (from Kent and the University of Waterloo, Canada) in the global collaborative research project on population ageing, asset values, and pension plans. This research has been supported by an international partnership of funders, including the Institute and Faculty of Actuaries, the Canadian Institute of Actuaries, and the Society of Actuaries in the US, with a total funding award of more than $500k.

Involvement in national and international research networks

Our staff are involved in numerous national and international networks. Launois is the UK lead and PI of the EPSRC-funded Anglo-French-German network in Representation Theory and its Applications (2018-21). McCrea is Director of the National Centre for Statistical Ecology (NCSE), a research centre spanning a number of UK institutions. Members of the Statistical Ecology theme ran short advanced training courses for NERC-funded PhD students and RAs (over 100 PhD students external to Kent). These were funded through three-year contracts with NERC worth £82k.

We coordinate three LMS-funded Joint Research Groups: Dunning has organised the South-East Mathematical Physics Seminars since 2014; Loureiro has organised Orthogonal Polynomials,

Special Functions, Operator Theory and Applications meetings since 2018; and Pech organised the COW seminar series (an algebraic geometry seminar across the southern UK) 2019-20. Members of the MPNS theme, led by Krusch, co-organise the Eastern ARC conference series on 'Topological Solitons and Quantum Fluids', which has been running annually since 2015. The School has also funded the Littoral-Kent Seminar series, led by Wood, since 2013.

Our staff are encouraged to organise or accept invitations to participate in long-term research programmes. Mansfield co-organised a six-month programme on Geometry, Compatibility, and Structure Preservation in Computational Differentiable Equations at the Isaac Newton Institute (INI) in 2019. Hydon was an invited participant in this programme. Clarkson was an invited participant in the Complex Analysis: Techniques, Applications, and Computations programme at INI in 2019. Roitzheim was an invited participant in the Homotopy Harnessing Higher Structures programme at the INI in 2018. Dunning co-organised a one-month programme on Integrability in Low Dimensional Quantum Systems, in Melbourne, 2017. Bowman and Launois took part in the thematic trimester programme on Representation Theory at the Institut Henri Poincaré, Paris, 2020. Hone was a visiting Professorial Fellow at the University of New South Wales in 2018-19, supported through their Distinguished Researcher Visitors Scheme. Dunning was supported by the Australian National University through their Mathematical Sciences Research Visitor Program for a five-week visit in 2019.

Collaborations with industry and other bodies

Our staff also collaborate extensively with industrial partners and other bodies. Bentham is collaborating with Imperial College, London, and the World Health Organization to understand the global trends in non-communicable diseases, including obesity, body-mass index, blood pressure, diabetes, underweight and overweight, by analysing public health data. He is also conducting genomic research with King's College London, and is collaborating with the MRC Epidemiology Unit at the University of Cambridge on associations between fruit and vegetable consumption and blood pressure. Bentham and McCrea provided consultancy to the Global Initiative against Transnational Organized Crime in 2020 through a £17k contract, measuring irregular migration and associated protection risks. Hadjiantoni (2016-19) was involved in a KTP project with Zero Trace Procurement Ltd, funded by the ESRC and Innovation UK. Kalli is collaborating with the economics research unit of the European Central Bank to evaluate the impact of fiscal policy decisions, using Bayesian statistical models to macroeconomic time series, and with the Berliner Wasserbetriebe (BWB). These knowledge transfer activities have led to one of our impact case studies. Matechou provided consultancy to the Department for Environment, Food and Rural Affairs (Defra) in 2019. Since 2013, Tapadar has been collaborating with Radfall Charitable Trust.

Community and outreach

In addition to the research-based outreach activities mentioned in Section 1 above, members of the School have connected with diverse audiences through a variety of media and activities over this REF period. Research by Bentham and collaborators on childhood obesity (*Lancet*) has received extensive media coverage (BBC, CNN, *Le Monde*, *El País*), and was discussed by Bentham on the National Public Radio (NPR) programme *All Things Considered* in the USA in 2016. Mansfield appeared on BBC Radio 4's *In Our Time* programme on Emmy Noether in 2019. As part of the Think Kent 'Discovers' series, research by Morgan and Dennis was showcased in the *Counting Butterflies* documentary, which was also reported in Kent Online in July 2020. Since 2019, the School has organised the Noether Public Lecture to showcase research in mathematical sciences to the public. In 2016, the School hosted the LMS Undergraduate Summer School. SMSAS also supported and hosted several LMS Undergraduate Research Bursaries. In 2015, we ran a CPD day for local secondary-school teachers, with research-led sessions based on the research of Dunning, Launois, Matechou, and McCrea.

Fellowships and prizes

- Marie Curie International Incoming Fellowship (Casteels, 2013-15; Naboko, 2013-15);
- EPSRC Established Career Fellowship (Hone, 2014-20);

- EPSRC Early Career Fellowship (Pearson, 2015-17);
- Leverhulme Trust Emeritus Fellowship (Brown, 2018-20; Morgan, 2017-19);
- Humboldt Research Fellowship (Bowman, 2018-20);
- Senior Anne Bennett Prize, London Mathematical Society (Clarkson, 2020);
- Guy Medal in Bronze, Royal Statistical Society (McCrea, 2020);
- Barnett Award, Royal Statistical Society (Morgan, 2020);
- UKRI Future Leaders Fellowship (Topley, 2020).

Editorial activity

Our staff have been members of editorial boards or editorial advisors for more than 20 journals since 2014. These include: *Quarterly Journal of Mechanics and Applied Mathematics*, *Studies in Applied Mathematics*, and *Acta Applicandae Mathematicae* (Clarkson), *Biometrics* (Cole); *Journal of Physics Communication* (Dunning); *Journal of the Royal Statistical Society, Series B, Bayesian Analysis, Statistics and Computing* (Griffin); *Journal of Physics A: Mathematical and Theoretical and Journal of Nonlinear Mathematical Physics* (Hone); *Journal of Applied Econometrics* (Kalli); *Journal of Statistical Planning and Inference* (Kume); *Linear Algebra and Its Applications* (Lemmens); *Journal of Computation and Mathematics* (Mansfield); *Statistical Methods and Applications*, *Methods in Ecology and Evolution*, and *Journal of the Royal Statistical Society*, Series C (McCrea); and *Glasgow Mathematical Journal* (Roitzheim).

Conference invitations and organisation

In this REF period, members of the School have given plenary talks and lecture series all over the world, and have been invited to present their research at world-leading mathematics research centres, including Banff, Luminy, MSRI, Oberwolfach, ICMS, the Institute for Advanced Study (Princeton), and the Isaac Newton Institute. Since 2014, over 20 workshops/schools have been organised at Kent. In addition to the meetings mentioned in Section 1 above, the School has hosted numerous other events, including: seven LMS-supported Celebrating New Appointments meetings, the 2nd Eastern ARC Conference on Topological Solitons and Quantum Fluids (2016), and the LMS Research Summer School on Orthogonal Polynomials and Special Functions (2017), which attracted 43 PhD students from 19 countries.

Highlights of conferences organised outside Kent by our staff include:

- Bowman: co-organised the Mini-Workshop 'Kronecker, Plethysm, and Sylow Branching Coefficients and their Applications to Complexity Theory', Oberwolfach (2020).
- Clarkson: ICMS workshop on Applied and Computational Complex Analysis, Edinburgh, (2017); 2nd and 3rd IMA Conference on Nonlinearity and Coherent Structures, Norwich (2017) and Newcastle (2019).
- Hone: 12th SIDE conference, Montreal (2016); 'Hamiltonian Methods and Algebraic Structures in Integrable Systems', Tsinghua Sanya International Mathematical Forum, China (2019).
- Hydon and Mansfield: the inaugural LMS-IMA Joint Meeting, 'Symmetry and Computation', London (2017).
- Launois: scientific committee member of the CIRM conference 'Representations in Lie Theory and Interactions', Luminy (2018).
- Leisen: co-chaired the organising committee of the 12th International Conference on Bayesian Nonparametrics, Oxford (2019).
- Lemmens: co-organised 'Order Structures, Jordan Algebras, and Geometry' at the Lorentz Center, Leiden (2017); and 'Advances in the Geometric and Analytic Theory of Convex Cones'', Korea, (2019).
- McCrea: chair of the scientific programme of the International Statistical Ecology Conference, St Andrew's (2018).
- Shank: conference on 'Group Actions and Algebraic Combinatorics', Herstmonceux Castle (2016).

- Wood: LMS-EPSRC Durham Symposium 'Mathematical and Computational Aspects of Maxwell's Equations', Durham (2016).

Learned societies and professional bodies

Currently, nine members of staff in the School are on the EPSRC Peer Review College. Clarkson was a member of the LMS Research Policy committee (2014-18) and Vice-Chair of the Heads of Departments of Mathematical Sciences (2014-18). Cole was Chair of the Environmental Statistics Section of the Royal Statistical Society (2013-15). Dunning was Chair of the Institute of Physics, Mathematical and Theoretical Physics Group (2013-17). Launois was a member of the EPSRC Mathematical Sciences Strategic Advisory Team (2018-20). Mansfield was Vice-President of the Institute of Mathematics and its Applications (2014-18), a Council Member of the London Mathematical Society (LMS) (2011-15), and a member of the LMS Society Lectures and Meetings Committee until 2019. Matechou is Chair of the Environmental Statistics Section of the Royal Statistical Society (2019-present). McCrea is Secretary of the British and Irish Region of the International Biometric Society (2019-21), while Ridout was President of the British and Irish Region of International Biometric Society (2016-18).